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Rupture of Cerebral Aneurysm During Angiography

CHING TUNG LIU, M.D.
Walnut Creek

ONE OF THE MOST feared complications of cerebral angiography is rupture of an aneurysm during the procedure. Reported cases have not been numerous.^{1,2,3,4,5} The cause is not clear, but most authorities agree that the force of the injection does not play a role, nor does the nature of the dye. Wright⁵ noted that in three of his patients the aneurysm ruptured when the contralateral common carotid artery was being compressed during the procedure in order to obtain "cross filling." This led him to study the intra-arterial pressure in 100 arterial puncture procedures in 71 unselected patients. He found that prolonged manual compression of the contralateral common carotid artery caused a precipitate rise in the intracranial intra-arterial pressure which could account for the rupture of the intracranial aneurysm. The following is a case in point.

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Report of a Case

A 23-year-old man had sudden onset of headache on July 2, 1963, and spinal fluid aspirated that evening contained blood. There were no localizing neurological signs. Three days later right common carotid showed an aneurysm at the bifurcation of the posterior communicating artery. As the films were not satisfactory, angiograms were made again on July 8 and better delineation of the aneurysmal sac was obtained (Figure 1). Meanwhile, the spinal fluid had cleared up and the patient was improving clinically. On the tenth day after the onset of headache, an open angiogram was made of the left carotid artery under local anesthesia to complete the study and no abnormalities were seen in the vessels of the left hemisphere. Then as the puncture wound in the left common carotid artery was being compressed to stop bleeding, the patient suddenly shouted, "It's hurting on the right side." Within seconds the pain became generalized and he lapsed into coma immediately. We assumed that the aneurysm must have ruptured again and recognized that the prognosis was grave. In desperation, we decided to ligate the right common carotid artery. The incision on the left side of the neck was rapidly closed. The right common carotid artery was exposed and a Salibi-Silverstone clamp was applied with the arms of the clamp partially closed so that the diameter of the common carotid artery was



Figure 1.—Preoperative arteriogram. A "berry" aneurysm is shown arising from the internal carotid artery right where the posterior communicating artery originates. Note vasospasm distal to aneurysm. Other small round opacities are residual Pantopaque from previous myelogram for lumbar disc.

reduced by half. To our amazement, the patient gradually regained consciousness over a period of two hours. Spinal fluid aspirated at that time was grossly bloody. Over the next 24 hours the Salibi-Silverstone clamp was completely occluded without incident. The patient made a slow recovery with no neurological deficit except for slow mentation and forgetfulness.

Seven weeks later an open arteriogram showed the aneurysmal sac to be smaller than before and the posterior communicating artery was more clearly seen (Figure 2). At last report, a year after the first hemorrhage, the patient was working at his former job as a carpenter.

Discussion

Often when an aneurysm has been demonstrated on one side, a repeat injection is done and the opposite common carotid artery is intentionally com-

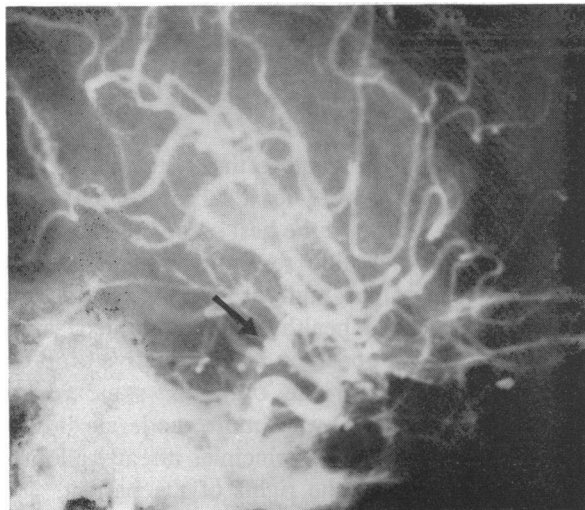


Figure 2.—Postoperative arteriogram seven weeks after ligation of common carotid artery. Aneurysmal sac is smaller than before and the posterior communicating artery is clearly visualized. Vasospasm has disappeared.

pressed to obtain "cross filling." This was the case in three patients reported upon by Wright.⁵ In the case reported by Abbott and coworkers¹ the right common carotid artery was being compressed during injection to obtain retrograde vertebral filling, but an unsuspected aneurysm of the opposite posterior communicating artery ruptured. There may be other unknown factors leading to aneurysmal rupture. For instance, in the cases reported by Jamieson³ and Jenkinson and coworkers⁴ the aneurysm was on the same side as the arterial puncture and immediate rupture was proven by the demonstration of extravasation of dye in the angiogram. There was no clear explanation for this complication. However, the studies made by Wright⁵ showed that the changes in the intra-arterial pressure may range from no change to 30 mm of mercury, with an average rise of 10 mm after 30 seconds of compression of the opposite common carotid artery. We believe that the hypothesis proposed by Wright is a sound one and we support his warning to avoid any prolonged manual compression of the common carotid artery when an aneurysm has already been demonstrated on the opposite side.

1855 San Miguel Drive, Walnut Creek, California 94598.

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